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ABSTRACT

Presented are two articles, an annotated bibliography, and other information useful in teaching about endangered species, especially those found in Florida. The articles provide an ethical rationale, teaching suggestions, and a discussion of the value of wildlife. Descriptions of over 100 pertinent books, periodicals, movies, and filmstrips are in the bibliography. The appendix lists Florida's endangered and threatened organisms along with organizations and agencies concerned with protecting endangered species. (WB)

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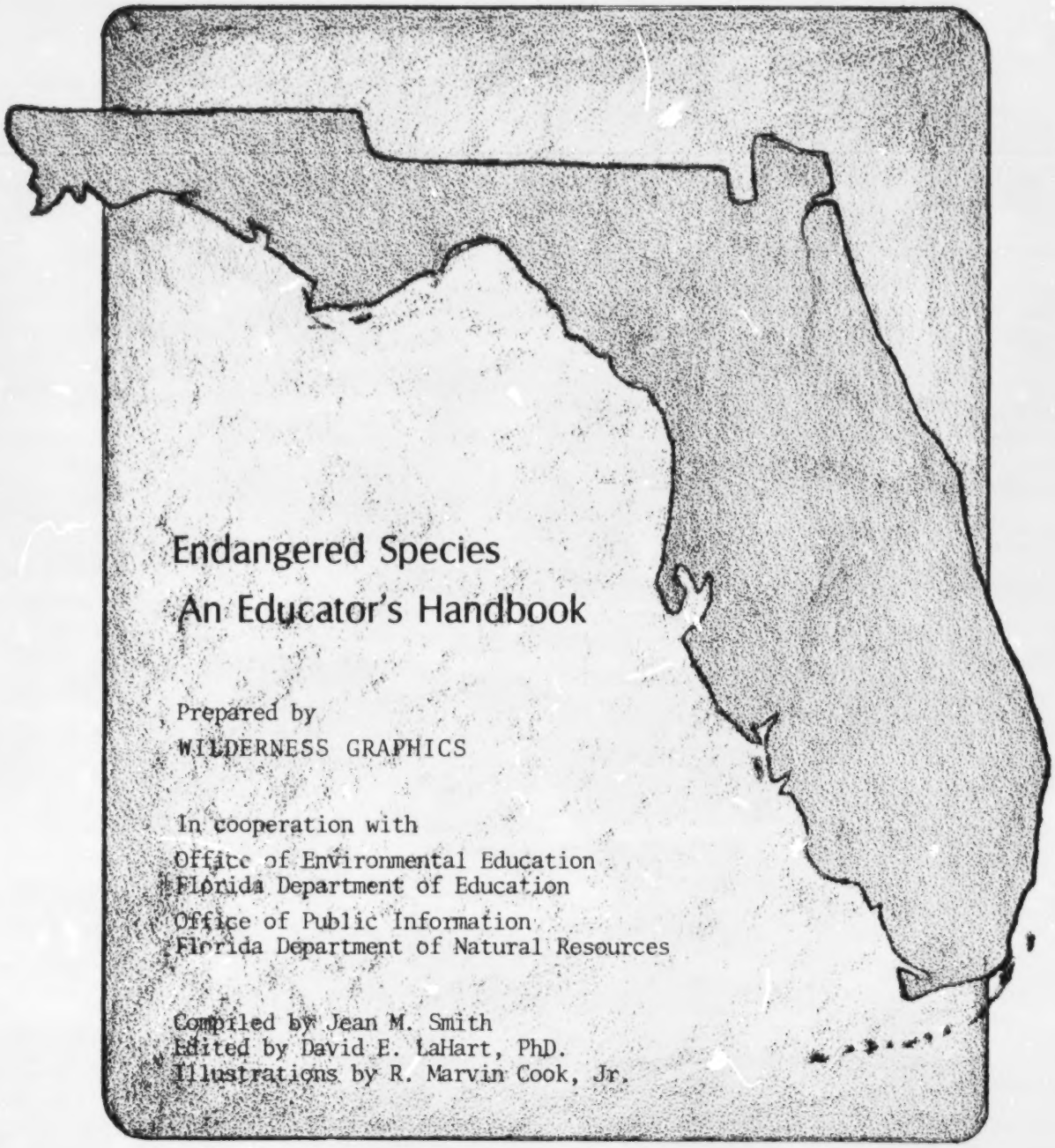
An Educator's Handbook



Endangered Species
An Educator's Handbook

Prepared by
WILDERNESS GRAPHICS

In cooperation with
Office of Environmental Education
Florida Department of Education
Office of Public Information
Florida Department of Natural Resources

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RALPH D. TURLINGTON
COMMISSIONER

STATE OF FLORIDA
DEPARTMENT OF EDUCATION

TALLAHASSEE 32304

AUGUST, 1978

Dear Educator:

As Florida continues to change, environmental education continues to increase in importance. The Department's commitment to interdisciplinary environmental education is exemplified by our continued service to districts, our unique mini-grant program, and our standing involvement with the Youth Conservation Corps.

When the Legislature enacted the Endangered and Threatened Species Act of 1977, it directed the Office of Environmental Education, the Game and Freshwater Fish Commission, and the Department of Natural Resources "to work together to develop a public education program." As part of the Department's response, we have developed "Endangered Species: An Educator's Handbook." Helping young people learn about endangered species is an important way of helping them learn about themselves and their environment.

I feel certain you will find this handbook a useful addition to your environmental education library. Remember, the Department is here to help you and if we can be of any assistance, please contact us.

Sincerely,

Ralph D. Turlington

Ralph D. Turlington

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ENDANGERED SPECIES

A Rationale and Some Teaching Suggestions

By: David E. LaHart, Ph. D.
The Florida State University

Conventional wisdom urges all educators to return to the basics. Each year legislators, legislatures, departments of education, school boards and principals order teachers to include this or that in their curriculum until there is no curriculum, only a series of mandated "issues" and "basics" which have to be learned. Some educators, concerned about humans, view education as more than reading, writing and calculating. After all, they argue, education includes the whole person and more.

This is particularly true when one considers relationships with other humans and other life. Nash (1977) examines the development of environmental ethics and concludes that we cannot give the freedom to abuse the earth any more than we can the freedom to abuse other people.

The Ecological Approach

Ecologists have long argued for ecological stability and maintaining community diversity. Leopold (1949) felt "A thing is right when it tends to preserve the integrity, the stability and beauty of the biotic community. It is wrong when it tends otherwise." Yet the Council for Environmental Quality's 1977 report indicates that 95 species or subspecies of vertebrates are known to have been exterminated since 1900. In the continental United States, 10 percent of our higher native plants are endangered or threatened; for Hawaii, the figures are much greater. Twelve percent of the Islands' native species are already extinct and another 38 percent are endangered or threatened. Among Hawaiian birds, the figures are worse; over a third are endangered and another third extinct.

These statistics take on an evolutionary meaning when one realizes that just 12 crops provide 90 percent of all human food. Almost half of the prescriptions filled each year contain drugs with natural origins. These species are used while other species alert people to environmental problems. Creatures ranging from the Bald Eagle to the lowly bacteria are highly sensitive to pollution and provide an index to environmental quality by their presence or, in some cases, the lack of it. Wildlife functions as a barometer of ecological stability and environmental quality. Ethics are restraints and should be extended to include the relationship of people to the earth as well as to other people. This ethical extension is the key to environmental responsibility. Endangered species, as components of ecological stability and as life itself, are part of this moral commitment. Learning about and caring for endangered species is a "basic" of environmental education.

The ecological argument centers around the usefulness of particular species to humans and to the environment. But what about life forms that are of absolutely no use? And what about abiotic things like air, water and soil?

The Ethical Approach

The first endangered species act said: "Of clean beasts and of beasts that are not clean, and of fowls, and of everything that creepeth upon the earth, there went in two and two unto Noah in the ark, the male and the female . . . ." This first act tends to support the Schweitzerian concept of "reverence for life". Species should be conserved because they exist and have existed for a long time. Existence is the criterion of value.

Moralists from St. Francis of Assisi to Charles Darwin have attempted to extend the human community to include all life but it was Leopold's notion of sequential ethics that focused attention on the land. "We abuse land because we regard it as a commodity to use. When we see land as a community to which we belong, we may begin to use it with love and respect."

Figure 1 attempts to graphically display the evolution of Leopold's land ethic.

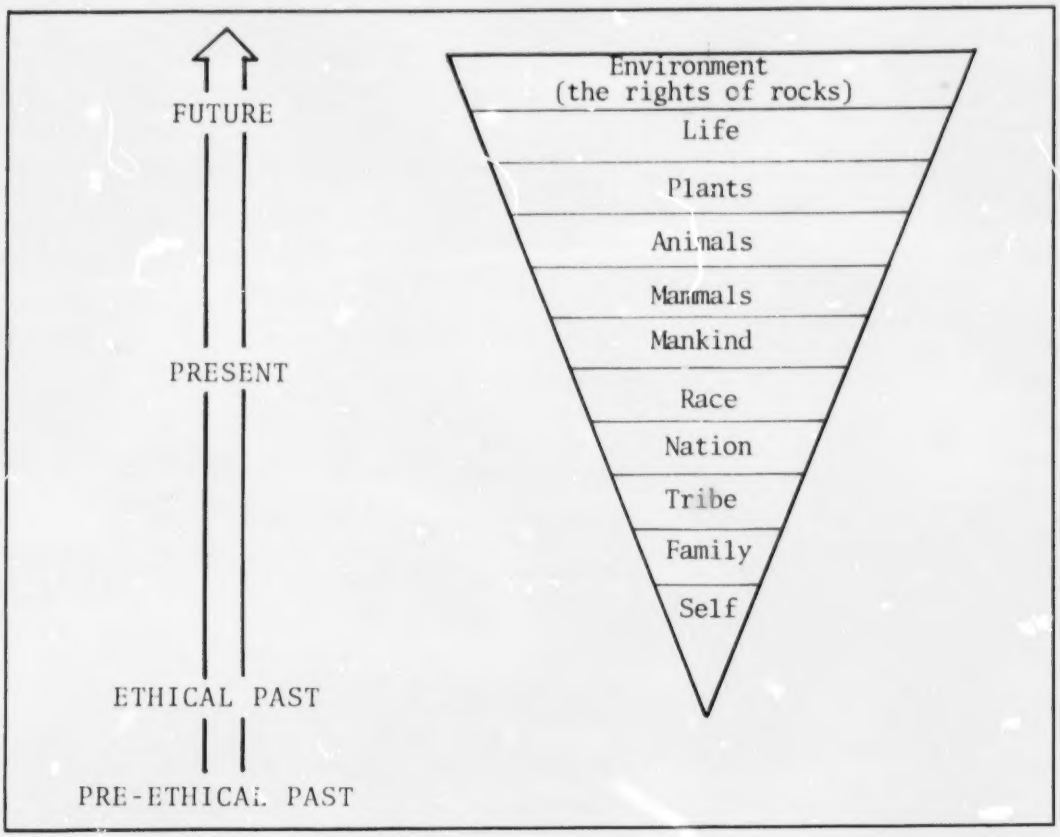


Figure 1 The Evolution of Ethics

The central idea expressed in Figure 1 is that ethics have evolved over time to encompass increasingly larger communities. The time scale in diagram expresses Leopold's assumption that at some point in the past ethics did not exist. The reason is simple: life existed before the mental capacity to think in terms of right and wrong. In what is labeled the "pre-ethical past", living things interacted on a strictly utilitarian, tooth-and-claw basis. The "ethical past" began when one form of life, man, evolved mentally to the point where it was possible to conceive of an action as being right or wrong on grounds other than those of utilitarianism. For eons, ethics applied only to the self and were hardly an improvement on the pre-ethical world of isolated struggles for existence. Under pressure to survive, a person might cannibalize his mate or offspring without remorse or punishment at this rudimentary stage of ethical development.

The first expansion of ethics included families. Now a mate and offspring are encompassed in the envelope of ethical protection even though outside the family circle all was a dark tangle of unethical relationships. The extension may well have been prompted by the impulse to sustain one's kind. Ethics, then, were aids in the struggle for existence. They prompted the instinctively competitive individual to cooperate, according to Leopold, "in order that there may be a place to compete for." This realization sprang from the individual's recognition that he was "a member of a community of interdependent parts." As Leopold, the ecologist, saw it, all ethics stemmed from this recognition of community. In this sense the diagram traces the expanding definition of community or society as well as of ethics.

The land ethic enlarges the boundaries of the community to include soils, waters, plants and animals. Yet different people have completely different perceptions of animals and their roles in modern society. Loyal mammals are often included as parts of our family. Some are loved as children and most people would be shocked at the sight of someone killing a horse or a dog. But the ethics soon pass when other forms of life are included in the equation. Few would be offended at the sight of someone trapping a rat or spraying a column of ants. Snakes, insects and spiders are outside the ethics of most people.

Once the pet stage in Figure 1 is passed, man's capacity for ethical relationships with other life forms declines rapidly. Only a few feel that plants of any kind deserve inclusion in the ethical fold; still fewer extend ethics to amoebae, bacteria, and similar primitive organisms. To do this is to affirm the value of life itself. Leopold's ecological perspective led him to see the role and importance in environmental processes of the most humble member of the life community. But he distinguished between importance and utility. The "Biotic team," as he called it, did not work for man any more than it did for snakes or spiders.

The highest level of ethical evolution involves man's relations to parts of the environment not commonly regarded as alive such as air, water, and soil. Leopold clearly had this extension in mind. He defines the "biotic team" as including inanimate matter like soil and water. Land, in fact, was Leopold's shorthand term for the entire environment.

Endangered species reflect the condition of our environment and, to many, reflect the quality of life itself. By teaching about endangered species educators are teaching about life, ethics and being human.

Red-cockaded Woodpecker

Instructional Strategies

Children grow through both intellectual and moral developmental stages and these should be carefully integrated into curriculum materials. Kohlberg (1968) has hypothesized that individuals go through the same kind of ethical progression outlined in Figure 1. The infant is pure self-interest. Moral development begins with the mother and father, spreads to grandparents and uncles, eventually to the neighborhood, the town, and in time, to the country and species. The acceptance of restraints on the maturing child's self-interest is implicit in this development. They learn that it is morally wrong to take a playmate's toy, a citizen's wallet, or the land of a foreign nation. According to Kohlberg, ontogeny recapitulates phylogeny in ethical as well as biological ways (Nash, 1977.)

LaHart and Tillis (1974) have applied the Kohlberg model to human perceptions of endangered species. Figure 2 summarizes Kohlberg's six developmental stages using endangered species as examples.

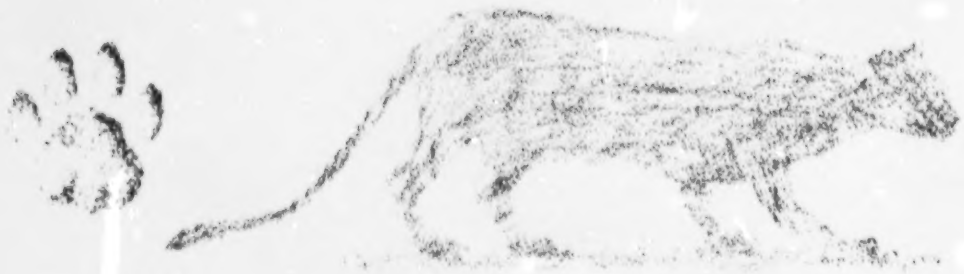
FIGURE 2

The Kohlberg Model of Moral Development and Endangered Species

LEVEL	BASIS OF MORAL JUDGMENT	DEVELOPMENTAL STAGE	EXAMPLE
I	Moral values reside in external happenings; based on needs rather than persons or standards.	Stage 1. Obedience and punishment orientation. Objective responsibility.	1. I want to be loved by my mother who is worried about endangered species, or; I feel we should help the alligator because if we don't the deteriorating Everglades environment will hurt me.
		Stage 2. Naively egotistic orientation. Actions satisfying to self and occasionally others.	2. I want to save the indigo snake because when I want one for a pet, I can go out and catch one, or; I want to protect the ivory billed woodpecker because someday I might be able to get one on my life list.
II	Moral values reside in doing good or right things, in maintaining conventional order and the expectancies of others.	Stage 3. Good-boy orientation. Conformity to images of majority; judgment by intentions.	3. If I help endangered species, people will like me, or; It's a class project and I want to fit in. Everyone is doing it.
		Stage 4. Authority and social order orientation. "Doing duty." Regard for the earned expectations of others.	4. The President says it's good to preserve endangered species, or; They are God's creatures and we should preserve His creatures.
III	Moral values reside in conformity by the self to shared or sharable standards, rights, or duties.	Stage 5. Contractual legalistic orientation. Duty defined in terms of contract and the right of others.	5. A large number of people in the community feel their life will be less human without many of the animals of the earth, therefore, it is my obligation to work for the preservation of these animals to help m brothers be humanists.
		Stage 6. Conscience or Principle orientation. Mutual respect and trust.	6. We should help preserve endangered species just because they are fellow passengers on Spaceship Earth.

Modified from Kohlberg (1968) and LaHart and Tillis (1974).

The Kohlberg model is useful in research, curriculum development and evaluation. Using endangered species so students make value judgments leads to cognitive conflict. Curiosity produces the essential starting point for inquiry. Inquiry about the moral, social, and ecological implications of an individual's values and the critical examination of these decisions is a major goal of environmental education.



LaHart and Allen (1977) developed a simulation that employs the critical incident technique to help participants make judgments concerning the fate of endangered animals. These critical incidents are contrived but are based on real-life situations. The alternatives provided are derived from the three major levels of the Kohlberg model. For example, one critical incident involves the Florida panther and a deer hunter.

> You are deer hunting in the Ocala National Forest and your dogs are chasing an animal to your stand. You get a quick look at it jumping over a log and realize it is a panther.
>
> Your choices are:
>
> A. Don't shoot it because you'll probably get caught and fined.
>
> B. Shoot it and have the head mounted; the trophy is worth any fine.
>
> C. Don't shoot it because your non-hunting friends will really be upset and besides its against the law to shoot a panther.
>
> D. Shoot it; panthers are dangerous and deer killers.
>
> E. Don't shoot it; this single animal might be vital to the survival of the entire species, or;
>
> F. Shoot it; the law is wrong. These animals are dangerous and don't belong in family recreational areas.

Using this critical incident and applying the appropriate weights or rewards to each alternative, participants make decisions based on their existing values. The moral, social, and ecological consequences of their decisions can be examined through discussions or through existing simulation techniques.

Another method for using endangered species to help learners examine their own environmental values is the case study. Wildlife is always in the news. It takes real imagination to develop a case study

based on the scientific principles applied to wildlife populations. Case studies also dramatize the economic, political, and social implications involved in environmental decision-making. They seduce students into generating their own explanations.

The problem of the "tiny" Snail Darter makes excellent intellectual fodder for students of all ages. Of the more than 4500 consultations the U.S. Fish and Wildlife Service has conducted, only 3 could not be resolved administratively and went to court. Of the three court cases, only one -- the Snail Darter and Tellico -- has gone to the Supreme Court. The ecological, economic, political and moral implications of the case and ultimate disposition by the Court (which decided in favor of the fish) makes excellent case study material. Ideally, the study will stimulate student interaction and discussion to the point where "proof" is needed. Researching and discussing alternatives lead to understanding the concept of biotic potential and that as environmental conditions change, so do the resident animal populations. But even if these scientific principles are not learned and understood, students are led, through inquiry, to the realization that there are no simple solutions to environmental problems. To paraphrase Muir, they discover that everything is hitched to everything else.

But this is only half the exercise. When the students have decided which alternative is "best" ask them "why?" Place their answers and reasoning within the frame of the Kohlberg model and study it. By helping students examine the ecological and moral reasoning behind their choices, teachers can help students examine their own values and when values are clearly understood, positive change in environmental behavior results.

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Caracara

WILDLIFE

Our Environmental Barometer

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709 Wire Building
Washington, D.C. 20005

Habitat Determines Wild Populations

Fish and wildlife are highly sensitive to environmental change. Alter stream temperature or flow, drain wetlands, channel natural water-courses, clear forests or make other changes that limit their food, water or shelter and fish and wildlife are immediately affected.

The composition and condition of fish and wildlife populations serve as a barometer of environmental quality for people, because we too must have clean water, fertile fields, and healthy forests. Consequently, proper use of our nation's land and water resources is in our interest and of the fish and wildlife we enjoy.

Nearly every wild fish, bird or animal has a comparatively narrow range of environmental requirements that determines its survival. These may be divided broadly into food, water, and cover. But, every species' need for each of these essentials differs to some degree from those others.

Climate, topography, and geology in a given area are basic influences on the composition of the plant community, and the nature and abundance of the local plants, in turn, govern the kinds of wild animals that the area can support.

Human changes in the environment need not be destructive of wildlife in general, although they may alter radically the composition of the wildlife population. Felling an isolated woodlot and replacing it with corn, for example, will eliminate gray squirrels but may improve conditions for pheasants. Flooding the entire cornfield would drive out pheasants but create useful habitat for ducks and muskrats. Altering or maintaining the environment to favor the needs of wild species is a basic technique of wildlife management.

Some environmental changes, however, may be extremely damaging to wildlife. Excessive pollution, repeated uncontrolled forest fires, and farming and forestry practices that destroy soil fertility and the diversity of the plant community can create wildlife deserts.

The transformation of America from wilderness to an urban-dominated landscape has brought great changes in the composition of the native wildlife. Species like the Woodland Caribou and Ivory-billed Woodpecker, which require habitats supplied only by wilderness, inevitably declined. But their places usually were taken by other species better adapted to an environment shaped by humans but, like the Starling, are not always as well liked.

Humans and Wildlife

When desirable wildlife begins to disappear from a given area, in spite of legal protection, it is an indication that something is wrong with the environment. And the effects of humans may extend far beyond the loss of esthetic and recreational values.

The basic needs of wildlife are essentially the same as those of man. Most species of wildlife are products of a clean, fertile, and productive environment. They must have adequate food, clean water, and protection from the elements if they are to survive. So must humankind.

Even the most urban-oriented citizen, who rarely ventures from the asphalt and concrete of modern Metropolis, needs a constant supply of uncontaminated water, meat from ranches and rangelands, produce from farms, fish from seas and estuaries, and paper pulp from forests. Although he may not think of them in such terms, these far-flung natural and cultivated areas are essential parts of the habitat of modern man.

The lands and waters that produce these commodities also harbor the bulk of our wildlife, and their capacity to support fish, birds, and mammals is a good indicator of their capacity for meeting the basic needs of man.

Wild Lands Have Human Values

Most modern Americans are only beginning to recognize their close bonds with the natural world. A sign of this is found in changing attitudes toward swamps, marshes, and tidal estuaries. Until recently, these wetlands, cherished only by sportsmen and naturalists, generally were considered worthless until drained or filled. Unfortunately too many people still consider that their highest economic use is to serve as dumping grounds for the solid and liquid wastes of cities and industries.

The effects of this negative attitude have been apparent to sportsmen and wildlife scientists for many years. Marshes that once teemed with songbirds, shorebirds, waterfowl and a variety of mammals, their waters clouded by noxious bacteria and algae, now support little but starlings and rats. Many wetlands have disappeared completely under the avalanche of human expansion?

So what?

Are not housing and factory sites, airports, and highways, and even convenient dumps more valuable to people than a few ducks and songbirds? Perhaps to a few, but today's outcries of concern make clear that people are seeking effective ways to halt the accelerating destruction of their environment.

Unspoiled tidal marshes rank in economic productivity above the best prairie croplands. Marsh-rimmed estuaries are vital to the more important commercial marine fishes and to crabs, shrimps, and shellfish. Continued destruction of tidal wetlands threatens a major source of human food and the livelihoods of many people. A study of tidal bays and estuaries in Massachusetts revealed the presence of 84 species of fish at some stage in their life cycle.

Inland ponds, potholes, and marshes -- vital breeding grounds for waterfowl and natural refuges for many other forms of wildlife -- also have important economic values. In many places they are essential functioning units of the natural recharging of underground water supplies -- vital to local agriculture, industry and human existence.

Oil spills and their immediate effects on wildlife have stirred great public indignation in the past few years. But run-away oil slicks are only the more obvious signs of a far greater problem.

Much of the pollution that originates on the land finds its way to the seas -- pesticides carried by the air or washed into rivers, chemical wastes from factories, detergents from laundries and kitchen sinks, untreated sewage, water-soluble solids dumped offshore, carbon dioxide from heating plants, and lead and carbon monoxide from motor vehicles and aircraft.

Pine barrens tree frog

Pollution -- A Threat to Wildlife and Humans

A chilling threat -- not only to wildlife but to all life -- is seen by some scientists today in the cumulative effects of pollution on the oceans. Marine phytoplankton are the bases of food chains in the seas. Without these microscopic plants, all ocean life from the smallest shrimp to the largest whales would perish. Moreover, phytoplankton have approximately three times as much gross capacity for converting carbon dioxide to usable oxygen as all land plants combined. Their present abundance is essential, these scientists believe, to maintain the oxygen content of the atmosphere at a level that will support life.

But phytoplankton are extremely intolerant of acidity and trace elements, which are common in most pollutants, including pesticides. When carbon dioxide -- a near universal by-product of human activity -- is absorbed by sea water in quantities beyond those that marine plants can readily convert to oxygen, it creates an acid condition that kills the phytoplankton. Trace elements in other pollutants cause the death of more. If too many die, according to this sobering theory, the oxygen content of the atmosphere will fall, and Earth may become another dead planet.

The Trend Can Be Reversed

The trend can be reversed, if Americans and people of other nations have the will, intelligence, and prudence to act promptly and vigorously to cure the Earth's environmental ills. Wildlife that is threatened by air and water pollution and by the destruction of essential vegetation, soil erosion, and a general degradation of the environment can be saved.

By Saving Wildlife, We Can Save Ourselves

Wildlife populations can provide an important index or barometer of environmental quality. Today we are experiencing a decline in population of many wildlife species and an increase in the number of endangered and threatened species. Will humans be next?

Selected Bibliography

BOOKS * PERIODICALS * AUDIO-VISUAL - MOVIES & FILMSTRIPS

BOOKS

For Elementary Grade Students

Fox, M. The Wolf. New York: Coward, McCann & Geoghegan, Inc., 1973.

In this authoritative narrative about wolves, Fox explains the wolf's role in the balance of nature. The author is very sensitive about the preservation of this endangered species. It is good student reading.

Gray, R. Children of the ark. New York: Norton & Co., Inc., 1968.

Gray begins by comparing human population growth to a new flood that threatens wildlife claiming that another Noah's Ark is needed. In a readable, story-like manner, he then describes a cross section of mammals, birds, and reptiles that are threatened by man.

Hutchins, R.E. The last trumpeters. Rand McNally & Co., 1967.

This very well illustrated account of the Trumpeter Swan presents a historical view from pre-colonial days to the present time. He describes how a majestic bird is slowly increasing in population with man's help.

Illustrated encyclopedia of the animal kingdom, The (Vol. 20). Milan: The Danburry Press, 1971.

This beautifully illustrated compilation of endangered and threatened species is divided according to country. A description of each species is provided.

Kaufman, J. Fish Hawk. New York: Morrow & Co., 1967.

In this life history of the Osprey, Kaufman explores the different ways man has threatened this bird. He gives a good explanation of the food chain and how pesticides taken in by the Osprey are concentrated throughout the food pyramid.

Lauber, P. Who needs alligators? Champaign, IL: Garrard Publishing Co., 1974.

By describing the life history of the alligator, Lauber stresses the relationship between alligators and other animals. The final chapter defends the author's statement that "just about everyone needs alligators". The book has excellent photographs and many Florida Everglades scenes.

May, J. Islands of the tiny deer. Reading, Mass.: Young Scott Books, 1972.

This is the story of how the Key Deer, a rare type of whitetail deer were saved from extinction. It is a positive story, one which shows how humans can help.

McClure, R.M. Black Jack. New York: Morrow & Co., 1967.

McClure describes the life history of an alligator in the Okefenokee Swamp of Georgia. He points out the good this animal does for many other species, and how man has endangered it through over harvesting.

McClung, R.M. Thor, last of the sperm whales. New York: Morrow & Co., 1971.

In this book, McClung tells the story of a Sperm Whale. It describes the whale's habits. Attention is given to its encounters with man. The author consistently examines the role of man and the possible extermination of these whales.

McClung, R.M. Whooping Crane. New York: Morrow & Co., 1959.

McClung provides an excellent account of the life of the Whooping Crane. He follows its migration North, then back to the Aransas Refuge in

Texas pointing out the many dangers facing this beautiful bird. He emphasizes the problems man has caused the crane and tells what is being done to rectify them.

Roever, J.M. The Whooping Crane. Austin, Texas: Steck-Vaughn Co., 1971.

Roever gives the life history, migration patterns, growth rate and feeding habits of the Whooping Crane. He examines the factors involved in the endangerment of this bird and the steps taken to save it. He also mentions other extinct and endangered birds. The book is nicely illustrated by the author and is very well done.

Wood, F., & Wood, D. Animals in danger. New York: Dodd, Mead & Co., 1968.

Wood tells the stories of how man has nearly destroyed the Mountain Lion, the Whooping Crane, the Bald Eagle, the Sea Otter and other animals. He devotes a chapter to answering the question "Can we save endangered and threatened species?" This is very enjoyable reading and could be incorporated into a reading curriculum.

For Elementary Grade Teachers

Horwitz, E. (Ed.). Ways of wildlife. New York: Citation Press/Scholastic, 1977.

This excellent book was written by wildlife professionals for teachers. It presents some of the basic principles of wildlife science. Chapter 7, "The Disappearance of Species," is devoted to endangered and threatened species and describes how species have naturally become extinct. It also describes human influence on wildlife and endangered species. Teaching suggestions are included. For example, a list of endangered and threatened species tells where you can "have members of the class find out about the rare species, their habitat needs, and why they have become scarce."

Knight, V., & Moore, J. E. It's our choice. Ecological Science Series. New York: Globe Book Co., Inc., 1972.

Chapter 4, "... and Then There Were None," approaches the problem of endangered and threatened species from an international perspective. It shows how everyone is affected by a single nation's actions. This section is particularly good for social studies because of its international scope, and it mentions what the UN has tried to do to help. Teaching suggestions are included. For example, "on a map of the world, mark the countries that have animal populations threatened by unlimited commercial hunting. Try to find out what they are doing to stop the killing and protect their wildlife." Chapter 3 looks at "Wildlife and Pesticides" and Chapter 6, "New Life Replaces Old" devotes a section to the mustangs.

For Secondary Students

Laycock, G. America's endangered wildlife. New York: Norton & Co., Inc., 1969.

Laycock's excellent book tells about the struggle of 15 endangered species. Each description includes the habits of the animal and what man has done to jeopardize the animal's future. The last chapter tells of what is being done to correct the damages. An appendix lists endangered and threatened species of American wildlife.

McClung, R.M. Lost wild America. New York: Morrow & Co., 1969.

McClung gives an account of how Americans have treated wildlife since colonial days, how some species are completely exterminated, and how some have been saved. He also describes species that are pushed to the brink of extinction.

McMillan, I. Man and the California Condor. New York: Dutton & Co., Inc., 1968.

This book reflects McMillan's love and respect for the California Condor. He chronicles the history of interest in Condor preservation to the present generation of conservationists. Their efforts to save Condor habitat is carefully documented. It is good reading!

McNulty, F. Must they die? Garden City, N.Y.: Doubleday & Co., Inc., 1971.

McNulty tells of the problems facing the U.S. Fish and Wildlife Service because they poisoned the Prairie Dog and affected the endangered Black-footed Ferret. The book ends on a note of despair because of the Service's inability to educate ranchers and urges the various agencies to work together and preserve this unique wildlife form.

McNulty, F. The Whooping Crane. New York: Dutton & Co., Inc., 1966.

McNulty gives the success story of the Whooping Crane. He follows Cranes from the discovery of their nesting grounds in the Artic Circle to the winter home in the southern United States. The story is easy reading with many warnings about the still precarious nature of the extremely small population (about fifty) Whooping Cranes.

Silverberg, R. The Auk, the Dodo and the Oryx. New York: Crowell Co., 1967.

Silverberg begins by pointing out the difference between those animals which naturally become extinct and those that man has made extinct. He then describes the plight of the Dodo and a dozen more animals, devoting a chapter to each. He ends by examining ways to save endangered and threatened species through the conscious effort of humankind.

For Secondary Teachers and Students

Caras, R. A. Last Chance on Earth. New York: Chilton Books, 1966.

Caras' descriptions of 40 species includes information on each animal's habitat, man's influence, and the current status of the animal's population. For example, in describing the Arabian Oryx, he gives the animal's physical characteristics, its habitat, and how the oryx has been unprotected and hunted. Caras tells that there are presently 23 oryx in captivity and that the species may be capable of surviving in captivity. The book is an excellent international reference and has many illustrations.

Curry, L. & Curry, K. Let them live. New York: Morrow & Co., Inc., 1972.

This carefully researched book presents the history of almost one thousand species and sub-species of animals in peril of annihilation. It explains the ways man has destroyed more than 300 species in the past 3 centuries and examines what is being done and what must be done to save the remaining animals and their environment. The geographical and habitat arrangement make the book a useful reference.

Ehrenfeld, D. W. Conserving life on earth. New York: Oxford University Press, 1972.

This book devotes three of its chapters specifically to endangered species; "How Species are Threatened", "The Fate of the Blue Whale", and "Reservation of Species". The book provides the insight needed to understand how man is affecting wildlife. Destruction of habitat and other problems facing endangered and threatened species and the problems facing humankind while attempting to rectify the damage done to wildlife are carefully examined.

Fisher, J., Simon, N., & Vincent, J. Wildlife in danger. New York: The Viking Press, 1969.

This book gives an account of the animals, birds, and plants of the world that are threatened with extinction. It lists animals under their

taxonomic names, describes their history, appearance, behavior and why they are endangered. It is beautifully illustrated with color and black and white prints.

Line, L. (Ed.). What we save now . . . an Audubon primer of defense. Boston: Houghton Mifflin Co., 1973.

This is a collection of essays written by conservationists covering topics from the sea turtle to the prairie chicken and the Jamaica Bay Wildlife Refuge in New York City. The varied writing techniques of the many authors make pleasant reading.

Milne, L. & Milne, M. The cougar doesn't live here anymore. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1971.

The Milnes describe the plight of many animals including endangered species in a highly readable manner. They explain what humans must do to aid endangered wildlife. Chapter 7 describes the unique habitats on remote islands and the special hardships of the animals living there.

Seshadri, B. The twilight of India's wildlife. London: Baker Publishers, 1969.

Seshadri, an Indian, strongly identifies with the problems facing the wildlife of India. These problems are not strictly ecological but are also political. "The problems of wildlife conservation in India are mainly political and administrative . . . conservation is almost entirely in the hands of the politicians . . ." Habitat destruction seems to be a major problem.

Trefethen, J. B. An American crusade for wildlife. New York: Winchester Press, 1975.

Chapter 23, "The Threatened and Endangered", reviews the history of preserving endangered species. It goes from the first endangered species act of 1969 to the present act of 1973 and describes the people who had a part in the preservation of wildlife. For example, Trefethen describes J. N. "Ding" Darling's contributions to the preservation of the Key Deer and what is being done to preserve the Brown Pelican, Southern Bald Eagle, Florida Everglade Kite and others.

Wiley, L. Rare wildflowers of North America. Portland: Author, 1968.

Wiley provides a summary of species including descriptions, histories, distribution, rarity, propagation and flowering time of many endangered plants. The book has many excellent illustrations.

Ziswiler, V. Extinct and vanishing animals. New York: Springer-Verlag, Inc., 1967.

Ziswiler reviews direct (trophy hunting, hides, etc.) and indirect (habitat loss, pollution, etc.) forms of extermination and shows the necessity of protecting nature through research, conservation, and wildlife management. Appendix I contains a listing of birds and mammals that are already extinct and Appendix II lists the "most gravely threatened" animal forms.

For General Reading

Cox, J. A. The endangered ones. New York: Crown Publishers, Inc., 1975.

Cox divides information on endangered and threatened species according to county and gives a description of the problems associated with each species. For example, the Aleutian Canadian Goose population was decreased by the introduction of the Artic Fox to the goose's island habitat by men who sold furs.

Fitter, R. Vanishing wild animals of the world. New York: Franklin Watts, Inc., 1968.

This source book contains 43 paintings of vanishing animals, describing each vanishing species and its continental habitat. It provides many examples of animals that have been saved and suggests positive actions like translocation, legislation and law enforcement. The index lists extinct and endangered species.

Leen, N. And then there were none. New York: Holt, Rinehart & Winston, 1973.

This pictorial plea for America's vanishing wildlife contains many photographs of American endangered and threatened species and comments on the threat posed by man. This is an excellent reference for a classroom library.

Simon, N. and Geroudet, P. Last survivors. New York: The World Publishing Co., 1970.

This book describes 36 mammals and 12 bird species that are threatened with extinction. The animals chosen are representatives of continental regions and zoological orders. Examples of political and ecological problems as well as some of the efforts being made to resolve them are provided.

PERIODICALS

This is not an exhaustive list of magazines but an attempt to isolate a few articles that will appeal to teachers and secondary students. Magazines that receive wide circulation were chosen but don't limit your readings to these. Check with your school media people; they can help you find many more interesting and relevant articles.

Audubon, 1971, 73(5), 24; 26; 58-63; 72.

This issue of Audubon covers five stories describing the Everglade Kite, Stork, Prairie Falcon, Golden and Bald Eagles. This well written series provides valuable information on the natural history and the problems each species faces.

Buchheister, C. W. & Graham, F., Jr. From the swamps and back. Audubon, 1973, 75(1), 4-45.

Using the history of the Audubon movement as a vehicle, the plight of many endangered wildlife species are described. The egret was endangered by harvesting their plumes for hats; the government's campaign against the Prairie Dog nearly obliterated the Black-footed Ferret. Stories of the Osprey, coyote, Roseate Spoonbill, Whooping Crane and others provide interesting reading.

Carr, A. Great reptiles, great enigmas. Audubon, 1972, 74(2), 24-35.

The sea turtle is endangered by the resurgence of popularity of turtle meat and by-products. By reducing the demand, several species of turtle can be saved. Carr describes the various types of sea turtles and the organizations formed to save turtles from extinction. Suggestions for conservation are also included in this excellent article.

Graham, F., Jr. Endangered birds: Tinkering for time. Audubon, 1977, 79(6), 137-141.

This is an account of the attempts to revive a Puffin colony on the Easter Egg Rock, Maine, by transplanting Puffin chicks. Graham explains the technique for hatching the eggs of endangered birds and rearing the young. Is this wildlife management?

Gwynne, P. Wildlife in danger. Newsweek, January 6, 1975, pp. 36-41.

Gwynne gives an international perspective on endangered species and explains how progressive zoos are saving many species. This article raises many questions about the role of endangered species in capitivity.

Gwynne, P. & Gosnell, M. Fading flowers. Newsweek, July 14, 1975, p. 72.

Experts have come to realize that much of the world's plant life is in danger. This is harmful because "extinction of any species of plants is an irretrievable loss of unique genetic material that cannot be duplicated."

Hartman, D. S. Florida's Manatee, mermaid in peril. National Geographic, 1969, 136(3), 342-353.

Hartman describes the manatee and the influences on its decreasing population. He concludes that the responsibility to preserve manatees is a challenge to humankind.

Hill, A. O. Vanishing giants. Audubon, 1975, 77(1), 56-107.

Hill describes the right, bowhead, humpback, gray, and blue whales which have been commercially harvested to the threshold of extinction. The article follows the history of whaling, the life cycle of whales, and current conservation efforts.

Layne, E. N. Who will save the cacti? Audubon, 1973, 75(4), 4.

Collectors are threatening a suprisingly large number of cacti. This article describes the collector's attitude as "... he believed those were all that existed and he felt bound to take everyone in order to preserve the species..." Cacti, however, are extraordinarily

specific in their adaptation to their environment. They cannot be taken out of their environment in order to be preserved - their environment must be preserved.

March, J. Courage and art of wolf maintenance. Audubon, 1977, 79(6), 80-113.

This remarkable story describes a person that maintains a preserve for the endangered plains wolf. March covers the history of how the plains wolf has become endangered and describes the trials that are endured to preserve this species.

McNulty, F. Kill the Pupfish? Save the Pupfish! Audubon, 1973, 75(6), 40-47.

The deserts of the U.S. support the tiny pupfish. Development pressures are endangering its existence. This article reviews the natural history and fate of an "insignificant" life form.

McNulty, F. The silent shore. Audubon, 1971, 73(6), 5-11.

McNulty describes the danger that birds like the Brown Pelican, Bald Eagle, Osprey, Peregrine Falcon, and Cormorant face due to pesticides. This article is very well written and recommended reading for a basic understanding of the food chain.

Return of 'gators a double-edged "triumph". U.S. News and World Report, December 19, 1977, p. 30.

The increasing alligator population is good from the environmentalist's point of view but bad because of increased attacks on people.

Strohm, J. (Ed.). Special issue: Endangered species. National Wildlife, April, 1974.

This is the first special issue of National Wildlife. It is devoted entirely to endangered species of animals and plants in the United States. A section dealing with the past illustrates that species are constantly emerging and disappearing, but humans have greatly hastened the extinction of many forms of wildlife. This publication is extensively illustrated with excellent color photographs of representative species.

Truslow, F. K. Threatened glories of Everglades National Park. National Geographic, 1967, 132(4), 508-553.

Human transformation of Southern Florida has altered the Everglades' age-old water supply and endangered its incomparable wildlife. Truslow's photography and prose eloquently explain the problems.

The bibiliography of periodicals is a representative sampling of some widely distributed magazines. However, there are numerous sources for material on endangered species. These magazines are additional sources for articles.

American Forests

Florida Naturalist

Florida Wildlife

Georgia Outdoors

International Wildlife

Louisiana Conservation

Natural History

National Parks and Conservation Magazine

National Wildlife

The Nature Conservancy News

South Carolina Wildlife

Tennessee Conservationist

Wildlife of North Carolina

ELEMENTARY LEVEL

Curious Naturalists

National Geographic World

Ranger Rick, National Wildife Federation

Young Naturalists

AUDIO-VISUAL

MOVIES - 16 mm, Color, Optical Sound Films

For Student Use

American Bald Eagle, The. C and B & W, 16 min., 1970.

This film presents the life cycle of the Bald Eagle while emphasizing the need for preserving this endangered species. There are many scenes from Florida and Alaska.

Available from: Coronet Instructional Films
65 East South Water Street
Chicago, IL 60601

And so ends. 25 min., 1971.

This film pleads for the protection of the whales and gives an historical view of whaling.

Available from: Pyramid Films
Post Office Box 1048
Santa Monica, CA 90406

Aransas. 28 min.

By telling the story of the Aransas National Wildlife Refuge, the major wintering ground of the Whooping Crane, this film demonstrates the role that wildlife refuges are playing in the nation's conservation program.

Available from: Acorn Films
33 Union Square West
New York, New York 10003

At the crossroads. 26 min.

This dramatic film shows the struggle for survival of many wild animals. It presents the mistakes of the past which have resulted in the extinction of some species.

Available from: Stouffer Productions
Post Office Box 15057
Aspen, CO 81611

Buffalo, an ecological success story. 13 min., 1972.

A good natural history of the buffalo is presented in this film. The buffalo's physical traits, natural habitat, and struggle for survival are presented along with the wildlife management techniques used to increase the buffalo's population.

Available from: Encyclopedia Britannica Ed. Corp.
425 North Michigan Avenue
Chicago, IL 60611

Ecology - wanted alive. 10 min., 1972.

This film views extinct and endangered species by examining the destruction of their habitats and the effects of pollution and insecticides.

Available from: AIMS Instructional Media Services, Inc.
626 Justin Avenue
Glendale, CA 91201

Empty nest, The. 20 min., 1973.

This film provides an informative study of the osprey's habits and how the food chain assimilates the deadly effects of pesticides in the environment.

Available from: Learning Corporation of America
1350 Avenue of the Americas
New York, New York 10019

Keepers of wildlife. 21 min., 1974.

Canadian Wildlife Service personnel are shown attempting to save and protect endangered species like the Whooping Crane and Grizzly Bear.

Available from: ACI Productions
35 West 45th Street
Eleventh Floor
New York, New York 10036

Problems of conservation - wildlife. 13 min., 1970.

(From the Problems of conservation series.)

By identifying endangered wildlife, this film stresses the natural process of decline and extinction. Current efforts to conserve wildlife are an important part of this film.

Available from: Encyclopedia Brittanica Educational Corp.
525 North Michigan Avenue
Chicago, IL 60611

So little time. 11 min., 1974.

This film is a poetic treatise pleading for the preservation of the beautiful water birds in America.

Available from: AIMS Instructional Media Services, Inc.
626 Justin Avenue
Glendale, CA 91201

Survival of the Kit Fox - a conservation case study. 15 min., 1967.

This film shows the Kit Fox in each of the four seasons; building her den, raising her young, and hunting for food. This natural history approach to wildlife conservation illustrates many conservation principles and techniques.

Available from: Journal Films, Inc.
930 Pitner
Evanston, IL 60202

Vanishing breed, The. 30 min., 1970.

(From the Man builds - man destroys series.)

This film discusses preservation and explains why animals should be protected. It also presents the conflict between conservation and industry.

Available from: Great Plains Instructional TV Library
University of Nebraska
Post Office Box 80669
Lincoln, NB 68501

Vanishing species of North America. 10 min.

This film portrays 27 endangered mammals and birds in their natural habitat.

Vanishing species of North America.

Available from: Stouffer Productions
Post Office Box 15057
Aspen, CO 81611

What good is a warbler? 13 min., 1975.

The tiny, endangered Golden-cheeked Warbler illustrates the complex dependency of biotic and abiotic factors with human activities. This production illustrates that every living thing plays an important role in continuing natural cycles.

Available from: Adams Film Productions
706 Wayside Drive
Austin, TX 78703

For General Use

Africa's vanishing wildlife. 15 min., 1967.

Africa's wildlife is in danger. This film describes how the expanding population of Africa is harming important wildlife habitat.

Available from: BARR Films
3490 East Foothill Boulevard
Pasadena, CA 91107

Bald Eagle, The. 33 min., 1961.

Although this beautiful film is basically a natural history, it shows why many immature eagles fall victim to gunners and tells what Americans can do to help save this bird.

Available from: National Audubon Society
950 Third Avenue
New York, New York 10028

Bighorn with John Denver. 52 min., 1975.

This film considers the habitat and behavior of Rocky Mountain Bighorn Sheep and shows how the lives of the sheep are being threatened by human activities.

Available from: Learning Corporation of America
1350 Avenue of the Americas
New York, New York 10019

Death of a legend. 51 min., 1971.

This film examines the plight of the wolf and relates it to the plight of other species of North American wildlife that have fallen prey to humans and their technology.

Available from: Canadian Wildlife Service
Ottawa, Canada

Flight into oblivion. 14 min., 1970.

The life cycle of the Everglade Kite is depicted in this film. Measures being taken to prevent the extinction of this bird are also shown.

Available from: Florida Department of Commerce Film Library
Collins Building
Tallahassee, FL 32304

In search of the Bowhead Whale. 49 min., 1974.

This film examines the behavior and habitat of the Bowhead Whale, a nearly extinct species which lives in the Artic Ocean off the coast of Alaska.

Available from: National Film Board of Canada
1251 Avenue of the Americas
New York, New York 10020

So little time. 29 min., 1968.

Spotlighting human predation, this film tells the story of the extinction of the Passenger Pigeon and the Carolina Parakeet.

Available from: U.S. National Audio-visual Center
General Services
Administration
Washington, D.C. 20409

Vanishing prairie, The. 71 min., 1967.

Showing birds and animals now almost extinct, this film presents the story of the great American prairie and its vanishing wildlife.

Available from: Walt Disney Productions
Educational Film Divison
500 S. Buena Vista Avenue
Burbank, CA 91503

Man's thumb on nature's balance. Pt. 1 and Pt. 2, 28 min., 1971.

Humans cause profound environmental changes that often lead animals to extinction. Wildlife management techniques vital to many species are shown against a beautiful natural backdrop.

Available from: National Broadcasting Company
Educational Enterprises
20 Rockefeller Plaza
New York, New York 10020

Of broccoli and pelicans and celery and seals. 30 min., 1971.

(No. 1 in the Our vanishing wilderness series.)

Stressing the dangers of pesticides to humans and nature, this film follows pesticides from crop spraying to the sea where the chemicals contaminate fish which in turn are eaten by birds, seals and man.

Available from: Indiana University
Audio-visual Center
Bloomington, IN 47401

Otters, clowns of the sea. 14 min., 1973.

While presenting the Southern sea otter in a variety of moods, this film explains that as a protected species, the otter is now flourishing.

Available from: Paramount-Oxford Films
5451 Marathon Street
Los Angeles, CA 90038

Our endangered wildlife. Pt. 1 and Pt. 2, 26 min., 1968.

Several species of endangered wildlife are described in these films. Modern conservation methods are emphasized.

Available from: McGraw-Hill Films
1221 Avenue of the Americas
New York, New York 10020

Prairie world of the Kit Fox. 21 min., 1958.

The Kit Fox is pictured in this film. This endearing animal, only the size of a house cat, is becoming increasingly scarce each year.

Available from: Thomas J. Barbre Productions
2130 South Bellaire Street
Denver, CO 80223

Whooping Crane, The. 14 min., 1973.

Few animals symbolize the plight of endangered animals like the Whooping Crane. This beautiful film depicts the life history of the Whooper and the many problems facing North America's largest crane.

Available from: U.S. National Audio-visual Center
General Services
Administration
Washington, D.C. 20409

FILMSTRIPS

Elementary level

Bringing back the Buffalo. 132 frs., 1966.

The filmstrip describes the conservation work of the Wichita Mountains Wildlife Refuge in Oklahoma where the buffalo, Longhorn Sheep, Wild Turkey and other native forms of wildlife have been reintroduced.

Available from: Earl L. Hilfiker
284 Somershire Dr.
Rochester, N.Y. 14617

Last free bird, The. Rec., cas., script, 25 frs., 1971.

(From The weston woods sound filmstrip set, 30 series.)

This filmstrip tells the ecological story of what has happened to birds because of human interference.

Available from: Weston Woods Studios
Weston, CT 06880

Tales of endangered wildlife - a series. 309 frs., 1976.

Endangered species, from the Florida Everglades to the Alaskan wilderness are depicted in this production that shows how living things and humans are totally related. The following filmstrips are included in this series:

Ariel, the Whooping Crane.	53 frs.
Boca Grande, the Alligator.	49 frs.
Sierra, the Bighorn Sheep.	55 frs.
Stormy, the Buffalo.	49 frs.
Tor, the American Bald Eagle.	52 frs.
Woji, the Gray Wolf.	51 frs.

Available from: Coronet Instructional Films
65 East South Water Street
Chicago, IL 60601

Secondary level

Adapt, migrate or die. Cas., script, 49 frs., 1974.

(From the Sound filmstrip series for biology students.)

Adaptation, migration and the threat of extinction are carefully examined in this production.

Available from: Ed Media Tec., Inc.
Post Office Box 230
Wilkes-Barre, PA 18703

Endangered species. Pt. I and II, Rec., cas., 88 frs., 1974.

By examining human relationships to other animals this filmstrip studies human values and attitudes toward progress especially those relating to species threatened with extinction.

Available from: Prentice-Hall Media
150 White Plains Road
Tarrytown, NY 10591

Endangered species. Pt. I and II, Rec., cas., script, 45 and 39 frs., 1975.

The establishment of wildlife preserves has been a major management tool in the preservation of endangered species. This two part filmstrip explores the role of preserves and other ecological safeguards designed to enhance the survival of endangered species.

Available from: Multi-Media Productions
Post Office Box 5097
Stanford, CA 94305

Vanished and vanishing species - a series. 1973.

This filmstrip recounts how species from dinosaurs to Passenger Pigeons have already become extinct and presents ecological solutions for protecting endangered species, including stringent international regulations. Included in this series are:

Endangered species of North America.

Endangered species of the world.

Extinct species.

Protected species.

Available from: AIMS Instructional Media Services, Inc.
626 Justin Avenue
Glendale, CA 91201

All levels

Ecology at work - a study of the Sea Otter - a series. 235 frs., 1973.

The Sea Otter, a marine mammal, and its adaptive behavior, life cycle, and future are carefully explored in this excellent case study.

Life cycle and behavior of the Sea Otter.	79 frs.
Sea Otter and its environment, The.	92 frs.
Sea Otter and man, The.	64 frs.

Available from: Warren Schloat Productions, Inc.
150 White Plains Road
Tarrytown, NY 10591

Ecology at work - the case of the Bighorn Sheep. Pt. I and II, Rec., cas., 84 frs.

This filmstrip follows ecologist Jim Morgan through a two year study of the Bighorn Sheep population and its decline in the Rocky Mountains of Idaho.

Available from: Warren Schloat Productions, Inc.
150 White Plains Road
Tarrytown, NY 10591

Rescuing vanishing species. Script, C and B & W, 40 frs., 1973.

The impact of human activities upon the world's wildlife is demonstrated in this filmstrip along with some of the efforts being made to save dwindling species.

Available from: Visual Education Consultants
Box 52
2056 Helena Street
Madison, WI 53701

Vanishing animals of North America - a series. 248 frs., 1975.

This series presents several studies of extinct animals and the efforts to safeguard modern species threatened with extinction.

Damage to ecosystems.	51 frs.
Hunted animals.	49 frs.
Prospects for the future.	51 frs.

continued next page

Protected animals. 47 frs.

Tragedy of the past. 50 frs.

Available from: National Geographic Society
17th and M Streets, N.W.
Washington, D.C. 20036

Vanishing paradise, The. Rec., cas., 54 frs., 1972.

(From the South Pacific cultures series.)

The ecological changes in Hawaii are dramatized by using plant and animal life as examples.

Available from: RMI Film Productions
701 Westport Road
Kansas City, MO 64111

Whales - ecology. Cap., 60 frs., 1970.

(From the Animal kingdom series.)

The sound ecological arrangement between whales and the environment has been drastically upset by humans. This filmstrip shows pictures of the whaling industry, past and present, and the various species of whales in imminent danger of extinction.

Available from: Life Education Program
Box 834
Radio City Post Office
New York, NY 10019

World of endangered wildlife, The. Cas., script, 104 frs., 1975.

Evolution, environmental changes and human interference cause wildlife disappearance. This filmstrip discusses endangered species, shows the obstacles they face, and explains what can be done to prevent their extinction.

Available from: National Wildlife Federation
1412 16th Street
Washington, D.C. 20036

Appendix

ENDANGERED WILDLIFE & PLANTS * GOVERNMENT * CONSERVATION ORGANIZATIONS

Florida's Endangered and Threatened Wildlife

BIRDS

BACHMAN'S WARBLER: Status - endangered (state and U.S.). Florida status - very rare, possibly extinct. Distribution in Florida - unknown.

BALD EAGLE: Status - endangered (U.S.); threatened (state). Florida status - common. Distribution - coasts of Florida.

BROWN PELICAN: Status - endangered (U.S.); threatened (state). Florida status - common. Distribution - seacoasts.

CAPE SABLE SPARROW: Status - endangered (state and U.S.). Florida status very local and uncommon. Distribution - southern tip of Florida.

CARACARA: Status - threatened (state). Florida status - uncommon; restricted. Distribution - prairie regions of south-central Florida.

DUSKY SEASIDE SPARROW: Status - endangered (state and U.S.). Florida status - exists in sparse numbers in one local area. Distribution - vicinity of Merritt Island in Brevard County.

KIRTLAND'S WARBLER: Status - endangered (state and U.S.). Florida status - very rare. Distribution in Florida - migrant.

EVERGLADE KITE: Status - endangered (state and U.S.). Florida status - rare, about 150 individuals. Distribution - Everglades, Lake Okeechobee and upper St. Johns River.

PEREGRINE FALCON: Status - endangered (state and U.S.). Florida status - rare. Distribution - statewide, especially the coasts.

IVORY-BILLED WOODPECKER: Status - endangered (state and U.S.). Florida status - probably extinct. Distribution in Florida - unknown.

RED-COCKADED WOODPECKER: Status - endangered (state and U.S.). Florida status - fairly common. Distribution - statewide in old pine stands.

CUBAN SNOWY PLOVER: Status - endangered (state). Florida status - rare breeder. Distribution - west coast beaches.

FLORIDA GRASSHOPPER SPARROW: Status - endangered (state). Florida status - rare. Distribution - Osceola County to Hendry County.

WOOD STORK: Status - endangered (state). Florida status - locally common; restricted nesting sites. Distribution - swamps, marshes of peninsular Florida.

SANDHILL CRANE: Status - threatened (state). Florida status - common in suitable habitat of peninsula. Distribution - peninsula in suitable habitat.

ROTHCHILD'S MAGNIFICENT FRIGATEBIRD: Status - threatened (state). Florida status - one nesting colony. Distribution - Marquesas Key.

OSPREY: Status - threatened (state). Florida status - abundant. Distribution - statewide.

SOUTHEASTERN KESTREL: Status - threatened (state). Florida status - uncommon. Distribution - statewide.

ROSEATE TERN: Status - threatened (state). Florida status - fairly common in Florida. Distribution - nests in Florida Keys.

LEAST TERN: Status - threatened (state). Florida status - common in summer. Distribution - mainly on coasts.

WHITE-CROWNED PIGEON: Status - threatened (state). Florida status - common in Florida Keys, summer. Distribution - Florida Keys.

FLORIDA SCRUB JAY: Status - threatened (state). Florida status - common in restricted habitat. Distribution - oak scrub in peninsula.

LOUISIANA SEASIDE SPARROW: Status - threatened (state). Florida status common in restricted habitat. Distribution - central to northern Gulf coast.

FISHES

SHOAL BASS: Status - threatened (state). Florida status - common in restricted range. Distribution - Apalachicola and Chipola rivers.

OKALOOSA DARTER: Status - endangered (state and U.S.). Florida status - common within restricted range. Distribution - five streams emptying into Choctawhatchee Bay, Okaloosa and Walton counties.

SHORTNOSE STURGEON: Status - endangered (state and U.S.). Florida status - evidently very rare. Distribution - St. Johns River.

KEY SILVERSIDE: Status - endangered (state). Florida status - very rare, restricted range. Distribution - restricted to the Keys.

ATLANTIC STURGEON: Status - threatened (state). Florida status - very rare, except locally. Distribution - St. Johns & St. Mary's rivers; Suwannee River to Perdido River.

RIVER REDHORSE: Status - threatened (state). Florida status - rare; restricted range. Distribution - Escambia River.

CYPRESS MINNOW: Status - threatened (state). Florida status - rare; restricted range. Distribution - Escambia River.

SPECKLED CHUB: Status - threatened (state). Florida status - uncommon. Distribution - Escambia and Choctawhatchee rivers.

BLUESTRIPE SHINER: Status - threatened (state). Florida status - uncommon. Distribution - Apalachicola River.

LAKE EUSTIS PUPFISH: Status - threatened (state). Florida status - common within range. Distribution - Oklawaha chain of lakes.

SALTMARSH TOPMINNOW: Status - threatened (state). Florida status - uncommon. Distribution - estuaries of extreme western Florida.

RIVULUS: Status - threatened (state). Florida status - unknown. Distribution - estuaries of the lower third of the peninsula.

CRYSTAL DARTER: Status - threatened (state). Florida status - very rare; probably never common. Distribution - Escambia River.

BLACKMOUTH SHINER: Status - threatened (state). Florida status - very rare. Distribution - endemic to Blackwater Bay drainages.

HARLEQUIN DARTER: Status - threatened (state). Florida status - rare in restricted range.

SOUTHERN TESSELLATED DARTER: Status - threatened (state). Florida status - rare in limited range. Distribution - lower Oklawaha River.

GOLDSTRIPE DARTER: Status - threatened (state). Florida status - rare in limited range. Distribution - Choctawhatchee and Apalachicola River systems.

CYPRESS DARTER: Status - threatened (state). Florida status - restricted range. Distribution - Escambia and Choctawhatchee River systems.

STARGAZING DARTER: Status - threatened (state). Florida status - rare in limited range. Distribution - Escambia River.

KEY BLENNY: Status - threatened (state). Florida status - restricted range. Distribution - lower Keys, Monroe County.

MAMMALS

BLACK BEAR: Status - threatened (state). Florida status - uncommon, local. Distribution - scattered populations statewide.

EVERGLADES MINK: Status - threatened (state). Florida status - rare. Distribution - Lake Okeechobee to southwest coast.

FLORIDA PANTHER: Status - endangered (state and U.S.) Florida status - rare. Distribution - mainly in the peninsula.

INDIANA BAT: Status - endangered (state and U.S.). Florida status - rare. Distribution - Jackson County caves.

KEY DEER: Status - endangered (state and U.S.). Florida status - about 500; probably maximum for habitat. Distribution - lower Keys, mainly Big Pine Key.

KEY LARGO WOOD RAT: Status - endangered (state). Florida status - rare and local. Distribution - Key Largo.

GRAY BAT: Status - endangered (state and U.S.). Florida status - rare and local. Distribution - Jackson County caves.

MANGROVE FOX SQUIRREL: Status - endangered (state). Florida status - uncommon. Distribution - Big Cypress and Everglades.

GOFF's POCKET GOPHER: Status - threatened (state). Florida status - rare in restricted range. Distribution - Brevard County.

CUDJOE RICE RAT: Status - threatened (state). Florida status - unknown. Distribution - lower Florida Keys.

PALLID BEACH MOUSE: Status - endangered (state). Florida status -- rare and local. Distribution - Flagler and Volusia Counties.

KEY LARGO COTTON MOUSE: Status - endangered (state). Florida status - rare and local. Distribution - Key Largo.

SHERMAN'S FOX SQUIRREL: Status - threatened (state). Florida status - locally common. Distribution - central Florida.

CHOCTAWHATCHEE BEACH MOUSE: Status - threatened (state). Florida status - rare and local. Distribution - west Florida beaches.

PERDIDO BAY BEACH MOUSE: Status - threatened (state). Florida status - local. Distribution - west Florida beaches.

FLORIDA MOUSE: Status - threatened (state). Florida status - uncommon. Distribution - northern peninsula.

LOWER KEYS COTTON RAT: Status - threatened (state). Florida status - fairly common, restricted range. Distribution - lower Keys.

KEY VACA RACCOON: Status - threatened (state). Florida status - restricted range. Distribution - lower Keys.

MANATEE: Status - endangered (U.S.); threatened (state). Florida status - local. Distribution - mainly coastal.

REPTILES AND AMPHIBIANS

ALLIGATOR: Status - threatened (state); endangered (U.S.). Florida status - common. Distribution - statewide.

CROCODILE: Status - endangered (state and U.S.). Florida status - rare. Distribution - Florida Keys.

GREEN TURTLE: Status - endangered (state). Florida status - uncommon. Distribution - saltwater coasts.

ATLANTIC RIDLEY TURTLE: Status - endangered (state and U.S.). Florida status - rare. Distribution - saltwater coasts.

INDIGO SNAKE: Status - threatened (state and U.S.). Florida status - common locally. Distribution - peninsular Florida.

ATLANTIC HAWKSBILL TURTLE: Status - endangered (state and U.S.). Florida status - rare. Distribution - saltwater coasts.

PINE BARRENS TREE FROG: Status - endangered (state and U.S.). Florida status - recently discovered in state. Distribution - small population in west Florida.

ATLANTIC SALT MARSH WATERSNAKE: Status - endangered (state); threatened (U.S.). Florida status - uncommon within restricted habitat. Distribution - Volusia, Brevard and Indian River Counties; salt marsh.

SHORT-TAILED SNAKE: Status - endangered (state). Florida status - rare. Distribution - central Florida north to Columbia County.

FLORIDA GOPHER FROG: Status - threatened (state). Florida status - uncommon. Distribution - central and north Florida.

KEY MUD TURTLE: Status - threatened (state). Florida status - uncommon; restricted. Distribution - lower Keys, Big Pine Key, Key West.

SUWANNEE COOTER: Status - threatened (state). Florida status - unknown. Distribution - west Florida, Tampa Bay to Apalachicola region.

GOPHER TURTLE: Status - threatened (state). Florida status - unknown. Distribution - statewide.

ATLANTIC LOGGERHEAD TURTLE: Status - threatened (state). Florida status - uncommon. Distribution - saltwater coasts.

FLORIDA KEYS MOLE SKINK: Status - threatened (state). Florida status - uncommon; restricted. Distribution - Florida Keys and Dry Tortugas.

BLUE-TAILED MOLE SKINK: Status - threatened (state). Florida status - uncommon. Distribution - Lake Wales ridge, Polk and Highlands Counties.

SAND SKINK: Status - threatened (state). Florida status - rare. Distribution- Lake, Polk, Highlands and Marion Counties.

BIG PINE KEY RINGNECK SNAKE: Status - threatened (state). Florida status - uncommon; restricted. Distribution - Big Pine Key.

RED RAT SNAKE: Status - threatened (state). Florida status - not uncommon in suitable habitat; restricted. Distribution - lower Keys only.

MIAMI BLACK-HEADED SNAKE: Status - threatened (state). Florida status - rare; restricted. Distribution - Dade County; Key Largo.

FLORIDA BROWN SNAKE: Status - threatened (state). Florida status - not uncommon in suitable habitat; restricted. Distribution - peninsular Florida, protected lower Keys only.

Indigo snake

Florida's Endangered and Threatened Plants

Official list of endangered and threatened plants as provided in the Preservation of Native Flora of Florida Act, effective July 1, 1978.

ENDANGERED

Catopsis Bromeliad
Guzmania Bromeliad
Wild Pine Bromeliad
Prickly Apple Cactus
Tree Cactus
Cowhorn or Cigar Orchid
Dollar Orchid
Delicate Ionopsis Orchid
Orchid (Maxillaria crassifolia)
Ghost Orchid
Auriculated Spleenwort
Sinkhole Fern
Cuplet Fern
Hand Fern
Florida Royal Palm
Silver Palm
Orange Azalea
Chapman's Rhododendron
Lignumvitae
Atamasco Lily or Zephyr Lily
Key Cassia
Fringetree or Granny-graybeard
Miccosukee Gooseberry
Pride-of-big-pine
Florida Yew
Florida Torreya
Pitcher Plants
Ashe Magnolia
Pyramidal Magnolia
Narrow Swamp Fern

THREATENED

Bromeliads - All native species except Spanish Moss, Ball Moss, and those included in the endangered category.

Cacti - All native species except the spreading or prostrate-growing species of Opuntia and those included in the endangered category.

Orchids - All native species except those included in the endangered category.

Ferns - All native species except Common Bracken, Cinnamon Fern and Royal Fern, and those included in the endangered category.

Holly - All native Ilex species except Gallberry.

Palms - All native species except Saw Palmetto and those included in the endangered category.

Peppers - All native species (genus Peperomia).

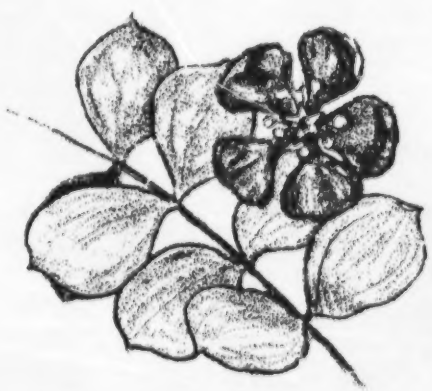
Azaleas - All native species (genus Rhododendron) except those included in the endangered category.

Coonties - All native species (genus Zamia).

Zephyr Lilies--All white species (genus Zephyranthes) except those included in the endangered category.

Pondapple
Dutchman's Pipe
Pine Pawpaw
Strawberry Bush
Dune Lily-thorn
Sand Cedar
Redbud
Fringetree or Granny-graybeard
Satinleaf
Yellow Hibiscus
Balsam Apple
Giant Dewflower
Geiger Tree
Dogwood
Cupania
Trailing Arbutus
Dogtooth Lily or Violet
Redberry
Simpson Eugenia
Garberia
Loblolly-bay
Anise Shrubs
Joewood
Wicky

Mountain Laurel
Gayfeather
Gulf Licaria
Corkwood
Pine Lily
Cardinal Flower
Crabapple
Dilly
Fall-flowering Ixia
Sandhill Milkweed
Yellow Hibiscus
Okeechobee Gourd
Fevertree
Fish-fuddle or Jamaica Dogwood
Scaevola
Jackson Vine
Bartram's Ixia
Bay Cedar
Mahogany
Tetrazygia
Mahoe
Sea Lavender
Tournefortia



Lignumvitae

State and Federal Agencies in the Southeast

Federal and state government are at the forefront in disseminating information about threatened and endangered species. The following is a list of the proper governmental agency to contact, at the federal level and the state level in the Southeast.

FEDERAL AGENCIES

Office of Endangered Species
U.S. Fish and Wildlife Service
1612 "K" Street, N.W.
Washington, D.C. 20036

Regional Director
U.S. Fish and Wildlife Service
Post Office Box 95067
Atlanta, Georgia 30347

Area Office
U.S. Fish and Wildlife Service
900 San Marco Boulevard
Jacksonville, Florida 32207

U.S. Department of Agriculture
Endangered Species Specialist
Forest Service
Washington, D.C. 20250

U.S. Forest Service
Southern Region
1720 Peachtree Street, N.W.
Atlanta, Georgia 30309

Forest Supervisor
National Forests in Florida
Post Office Box 1050
Tallahassee, Florida 32302

STATE AGENCIES IN THE SOUTHEAST

ALABAMA

Alabama Department of Conservation and Natural Resources
Game and Fish Division
64 North Union Street
Montgomery, Alabama 36130

FLORIDA

Florida Department of Natural Resources
Crown Building
[illegible] Blount Street
Tallahassee, Florida 32304

Florida Game and Fresh Water Fish Commission
Farris Bryant Building
620 South Meridian Street
Tallahassee, Florida 32304

GEORGIA

Georgia Department of Natural Resources
Office and Planning and Research
270 Washington Street, S.W.
Atlanta, Georgia 30002

MISSISSIPPI

Mississippi Game and Fish Commission
Post Office Box 451
Jackson, Mississippi 39205

SOUTH CAROLINA

South Carolina Wildlife and Marine Resources Department
Nongame and Endangered Species Secton
Post Office Box 167
Columbia, South Carolina 29202

Conservation Organizations

In addition to governmental agencies, private and citizens organizations may be concerned with various aspects of endangered species programs. The following is a partial list of potential sources of information on endangered species.

FLORIDA ENVIRONMENTAL AND CONSERVATION ORGANIZATIONS

FLORIDA AUDUBON SOCIETY
Post Office Drawer 7
Maitland, FL 32751

FLORIDA CHAPTER, SIERRA CLUB
Post Office Box 2692
Tallahassee, Florida 32304

FLORIDA CHAPTER, THE NATURE CONSERVANCY
Post Office Box 224
Homestead, FL 33030

FLORIDA DEFENDERS OF THE ENVIRONMENT, INC.
Post Office Box 12063
Gainesville, FL 32601

FLORIDA FORESTRY ASSOCIATION
Post Office Box 1696
Tallahassee, FL 32302

FLORIDA WILDLIFE FEDERATION
4080 Haverhill Road
West Palm Beach, FL 33407

NATIONAL ENVIRONMENTAL AND CONSERVATION ORGANIZATIONS

NATIONAL AUDUBON SOCIETY
950 Third Avenue
New York, New York 10038

NATIONAL PARKS ASSOCIATION
1701 18th Street, N.W.
Washington, D.C. 20009

NATIONAL WILDLIFE FEDERATION
1412 16th Street, N.W.
Washington, D.C. 20036

THE NATURE CONSERVANCY
1800 North Kent Street
Arlington, Virginia 22209

SIERRA CLUB
1050 Mills Tower
San Francisco, California 94104

THE WILDLIFE SOCIETY
7101 Wisconsin Avenue, N.W.
Washington, D.C. 20014

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Birds:
List of Threatened and Endangered Species, pp. 36-37.

Books:
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For Elementary Grade Teachers, p. 15.
For General Reading, p. 19.
For Secondary Students, pp. 16-17.
For Secondary Teachers and Students, pp. 17-19.

Conservation Organizations:
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"A Rationale and Some Teaching Suggestions." David E. LaHart, Ph.D., pg. 1-7.
Birds, List of Endangered Florida, pp. 36-37.
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Threatened Species:
See Endangered Species.

Wildlife:
List of Florida's Endangered, pp. 36-41.
"Our Environmental Barometer," reprinted from Wildlife Management Institute, pp. 8-11.